Impact of Truck Drivers' General Health and Fatigue on Truck Crashes

Guang Chen

National Institute for Occupational Safety and Health

2025 TRB meeting, Truck and Bus Safety Committee, Truck and Bus Operator Health and Wellness Subcommittee

Background: Current research on truck driver health and crashes

- University of Utah Study Findings*
  - Truck drivers with three or more medical conditions are two to four times more likely to be involved in a crash than healthier drivers.
  - Limitations: Data were sourced from one large trucking company and included crash data from only one year.

- In 2022, a NIOSH study highlighted the knowledge gap and called for research on the impact of driver health and fatigue on crashes.**

*Thiese MS,. Hanowski RJ, et al., 2017.. Multiple Conditions Increase Preventable Crash Risks Among Truck Drivers in a Cohort Study. *Journal of occupational and environmental medicine*, *59*(2), 205–211.

**Sieber KW, Chen GX, et al., 2022. Research gaps and needs for preventing worker fatigue in the transportation and utilities industries. AJIM 65; 857-866.

Background: Current research on fatigue and truck crashes

Federal Motor Carrier Safety Administration (FMCSA)'s Large Truck Crash Causation Study findings:

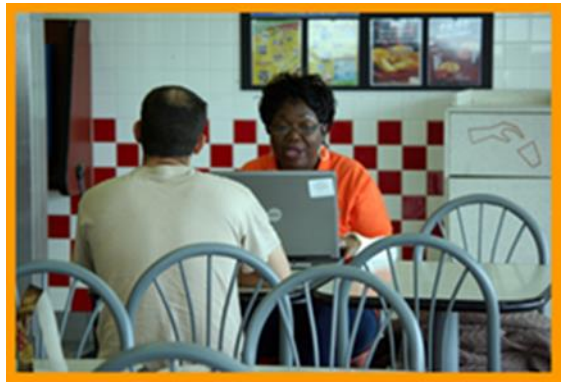
- 13% of all large truck crashes: Truck drivers' fatigue was identified as a critical factor.
- Limitations:
  - Follow-up interviews conducted after a crash may introduce recall bias and a tendency for participants to provide socially or legally acceptable answers.
  - The study only included interviews with crash survivors.

FMCSA. 2006. Large Truck Crash Causation Study. Large Truck Crash Causation Study | FMCSA

Objectives

- Examine the association among driver health and fatigue on crashes, using data from the NIOSH National Survey of Long-Haul Truck Driver Health and Safety.

Methods: NIOSH National Survey of Long-Haul Truck Driver (LHTD) Health and Injury



- A nationally representative sample of 1,265 LHTDs at 32 truck stops across U.S.
- Population surveyed
  - Driven a heavy truck for at least 12 months.
  - Spent at least one night away from home during each delivery run.
  - Be 21 years of age or older.

Sieber WK, Robinson CF, et al. 2014. Obesity and other risk factors: the national survey of U.S. long-haul truck driver health and injury. AJIM 57: 615–626.

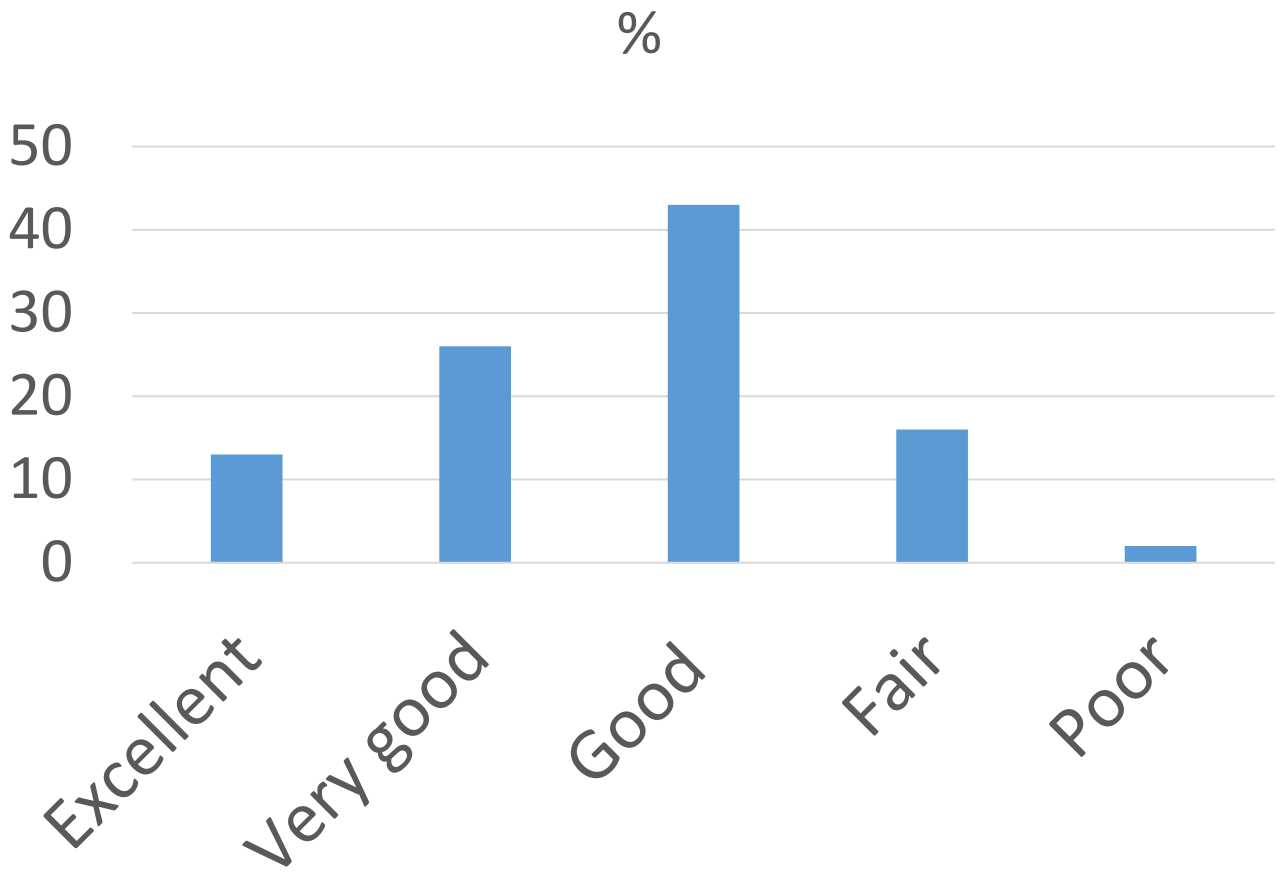
Methods: Statistical methods

- Logistic regression assessed the association among truck crashes and truck drivers' self-reported general health and fatigue.

Results: LHTDs self-reported if they were ever Involved in a DOT Reportable Crash

Ever crashed	Number of drivers	Percentage
No	829	66%
Yes	432	34%
Missing	4	0.3%

Results: LHTD self-reported overall health at time of survey



Would you say your health is…

Excellent,	1
Very good,	2
Good,	3
Fair, or	4
Poor?	5

Note: This is a standard question taken from the National Health Interview Survey (NHIS) conducted by NCHS. It is not specific to any individual symptom or condition.

Results: LHTDs self-reported personal experiences on the job in past 12 months

Experience	Number of drivers	%
Moving violation	249	20%
Hours-of-Service violation	532	42%
Nodded off while driving truck	458	36%

Source: NIOSH National Survey of LHTD Health and Safety.

Results: Logistic regression results using “ever crashed” as the dependent variable

Independent variables	Odds ratio+	P value
Age	0.017***	<0.01**
Sex, Male vs female	1.04	P=0.8
Nodded off while driving in past 12 months, yes vs. no	1.7	P<0.001**
Moving violation in past 12 months, yes vs. no	1.4	P=0.04*
Health, poor vs. excellent	3.8	P<0.01**
Health, fair vs. excellent	1.5	P=0.07
Health, good vs. excellent	1.5	P=0.04*
Health, very good vs. excellent	1.2	P=0.4

* Statistically significant. ** Highly statistically significant. *** Beta estimate.
+ Adjusted Odds ratio. This result comes from a multivariate logistic regression, where all variables listed above were included in the model.

Discussion: Summary of the study findings

- Factors associated with increased risk of ever having a truck crash include:
  - Older driver age*
  - Driver Fatigue
  - Speeding
  - Poor general health

* Older drivers might have a longer employment history as long-haul truck drivers and have driven more miles compared to younger drivers.

Discussion: Implications

To support driver health, and reduce fatigue and speeding, carriers might:

- Develop and implement fatigue management programs.*
- Promote driver fitness program.

*Sprajcer M, Thomas MJW, Sargent C, et al. How effective are Fatigue Risk Management Systems (FRMS)? A review. Accid Anal Prev. 2022;165:106398. doi:10.1016/j.aap.2021.106398

Discussion: Implications (2)

To support health and reduce fatigue and speeding, truck drivers might:

- Exercise regularly
- Eat healthy
- Have adequate sleep
- Drive within the speed limits

Sieber KW, Chen GX, et al., 2022. Research gaps and needs for preventing worker fatigue in the transportation and utilities industries. AJIM 65; 857-866.

Discussion: Implications (3)

To support health and reduce fatigue, state & private Partnerships might work together to:

- Provide healthy food options at truck stops
- Facilitate physical exercise at truck stops

Strengths of the NIOSH Survey

- The survey was conducted through a partnership between public and private organizations, ensuring diverse input and robust support.
- The survey was developed with contributions from a stakeholder meeting and a focus group discussion with LHTDs.

Limitations and what's next

- Limitations to the survey, include sample bias, interview bias, temporality, and indeterminable causality.
- The 2010 data are 14 years old.
- The trucking industry has seen transformative changes since the 2010 survey, including shifts in working conditions due to the COVID-19 pandemic and the integration of new technologies such as Advanced Driver-Assistance Systems (ADAS) and onboard camera systems, as well as the implementation of revised Hours-of Service rules.
- Currently exploring opportunities and interest in an updated long-haul truck driver survey.

Acknowledgement

- The NIOSH Survey team members
  - W. Karl Sieber, Jan Birdsey, Ted Hitchcock, Jennifer E. Lincoln, Stephanie G. Pratt

- Reviewers for the presentation
  - W. Karl Sieber
  - Jim Collins

Guang Chen

National Institute for Occupational Safety and Health

Division of Safety Research

Email: gchen@cdc.gov

Telephone: (304)-285-5995

For more information, contact CDC
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348 cdc.gov atsdr.cdc.gov
Follow us on X (Twitter) @CDCgov & @CDCEnvironment

The findings and conclusions in this presentation are those of the author and do not necessarily represent the official position of the National Institute for Occupational Safety and Health, U. S. Centers for Disease Control and Prevention.